



## Interface Oscillation in the Side-by-Side (SBS) Tape Casting of Functionally Graded Ceramics (FGCs)

Jabbari, Masoud; Bulatova, Regina; Hattel, Jesper Henri; Bahl, Christian

*Published in:*  
American Physical Society. Bulletin

*Publication date:*  
2012

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Jabbari, M., Bulatova, R., Hattel, J. H., & Bahl, C. (2012). Interface Oscillation in the Side-by-Side (SBS) Tape Casting of Functionally Graded Ceramics (FGCs). *American Physical Society. Bulletin*, 57(17), H7.00002 .  
<http://meeting.aps.org/Meeting/DFD12/Event/178153?mathjax=y>

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Interface Oscillation in the Side-by-Side (SBS) Tape Casting of Functionally Graded Ceramics (FGCs)** MASOUD JABBARI, Department of Mechanical Engineering, Technical University of Denmark, REGINA BULATOVA, Department of Energy Conversion and Storage, Technical University of Denmark, JESPER HATTEL, Department of Mechanical Engineering, Technical University of Denmark, CHRISTIAN BAHL, Department of Energy Conversion and Storage, Technical University of Denmark — Room temperature magnetic refrigeration is a new highly efficient and environmentally protective technology. Although it has not been maturely developed, it shows great applicable prosperity and seems to be a potential substitute for the traditional vapor compression technology. Tape Casting is a common process in producing multilayer ceramics, which now is used for producing side-by-side (SBS) functionally graded ceramics (FGCs). These FGCs are mostly used in the magnetic refrigeration sectors due to the varying composition of the magnetocaloric materials so that the magnetic transition temperature of the magnetic regenerator varies along the paths. The main goal of this research is to study the multiple material flow in SBS tape casting and analyze its influence on the interface between the stripes. The materials used for the experimental part are  $La_{0.85}Sr_{0.15}MnO_3$  and  $Ce_{0.9}Gd_{0.1}O_2$  ceramic slurries. The rheological behavior of the slurries are extracted from experiments and used in the ANSYS FLUENT commercial code to develop a fluid flow model for the non-Newtonian ceramic slurries and evaluate the interface oscillation between the stripes in SBS tape casting. The Numerical results show reasonable agreement with corresponding experimental results.

Masoud Jabbari  
Dept of Mechanical Engineering, Technical University of Denmark,  
Nils Koppels Allé, 2800 Kgs. Lyngby, Denmark

Date submitted: 31 Jul 2012

Electronic form version 1.4